

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re the Application of:

FRANCESCO A. CRUPI

Serial No.: 09/592,398

Filed: June 13, 2000

For: MIXING APPARATUS AND
METHOD FOR BLENDING MILLED
ASPHALT WITH REJUVENATING
FLUID

Group Art Unit: 3673

Examiner: A. Pechhold

Attorney Docket No.: 023266.42684
(Previously 50063.0000-1)

PETITION FOR EXTENSION OF TIME AND AMENDMENT

RECEIVED

DEC 28 2001

GROUP 3600

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicant hereby petitions the Assistant Commissioner for a two (2) month extension of time in which to respond to the Office Action dated as mailed on July 17, 2001. A check in the amount of Two Hundred Dollars (\$200.00) is enclosed to cover the extension of time fee specified in 37 C.F.R. §1.17(a)(2) for responding within the first month pursuant to 37 C.F.R. §1.136(a). If the enclosed payment is in error, please debit or credit Deposit Account No. 50-0858. Also, in the event an additional extension of time is required to consider this document, please consider this a petition therefor.

In response to the Office Action dated as mailed on July 17, 2001 and having a period for response extending through and including December 17, 2001 in view of the two month extension of time petitioned for herein, please amend the application as shown herein and consider the subsequent remarks.

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IN THE SPECIFICATION:

Please replace the Background of the Invention Section, beginning at page 1, line 5 and extending through page 2, line 14 with the following rewritten section:

--BACKGROUND OF THE INVENTION

Asphalt pavement consists essentially of an aggregate and sand mixture held together with a petroleum based binder, such as tar. With continued exposure to sun, moisture, traffic, freezing and thawing, asphalt pavement degrades. The degradation is principally in the binder, rather than the aggregate and sand mixture which makes up the bulk of the asphalt pavement. Also, much of the degradation occurs within the top two or three inches of the surface.

Traditionally, worn asphalt pavement was not restored but instead was torn up and replaced with new asphalt pavement. This is a costly approach and creates a problem as to what to do with the torn up pavement. Accordingly, techniques and apparatus have been developed for restoring or rejuvenating the top few inches of an asphalt pavement surface.

A typical road resurfacing machine has a heater for heating and softening the asphalt pavement surface as it passes along the surface. Following the heater is a "rake" or "scarifier" which breaks up or "scarifies" the softened pavement. The scarified pavement is generally crushed or "milled", blended with rejuvenating fluid and optionally additional sand or aggregate and redeposited. The redeposited material is spread out and rolled to create a rejuvenated surface comparable in quality to the original surface before degradation.

In order to produce a rejuvenated surface of high quality, it is important to ensure that an appropriate amount of rejuvenating fluid is added. Generally, a core sample or several core samples are initially taken of the surface to be rejuvenated and a desired ratio of rejuvenating material to milled material is analytically determined.

It is also important to thoroughly intermingle the milled material with the rejuvenating material, which will at least include a fluid but may also include additional sand and/or aggregate.

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It is an object of the present invention to provide a method and apparatus for thoroughly blending the milled material with at least the rejuvenating fluid and with any other rejuvenating materials. --

Please replace the paragraph beginning at page 5, line 20 and extending through page 5, line 25, with the following rewritten paragraph:

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--Behind the power plant 14 and also mounted on the transport structure 11 is a heater 16 which includes numerous burners and associated plumbing for heating an asphalt pavement surface 18 upon which the resurfacing machine 10 travels. A propane (or other combustible fuel) tank 20 and a combustion blower 22 serve the burners in the heater 16. The heater 16 directs heat at the asphalt pavement surface 18 to cause softening of an upper part of the asphalt pavement surface 18.--

Please replace the paragraph beginning at page 5, line 26 and extending through page 6, line 5, with the following rewritten paragraph:

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--The softened asphalt pavement surface 18 is initially dislodged by a raking device, generally indicated by reference 30, mounted to the transport structure 11, and which follows the heater 16. The raking device 30 has rakes which dislodge the heated asphalt pavement surface 18. The raking device 30 may include main rakes 32 and extension rakes 34, the extension rakes 34 performing a similar function to the main rakes 32, but to the outside edges. The main rakes 32 break up material around manholes where a main mill 36 behind the raking device 30 cannot run.--

Please replace the paragraph beginning at page 7, line 23 and extending through page 8, line 2, with the following rewritten paragraph:

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--A first stage shaft 110 is mounted to the first stage shell 104 for rotation about a first stage shaft axis 112 which extends transversely relative to the travel direction 12. A plurality of paddles 114 extend from the first stage shaft 110 in a direction generally radial relative to the first stage shaft axis 112. The paddles 114 are rotatable with the first stage shaft 110 within the enclosed chamber to blend the milled material with the rejuvenating fluid. The paddles 114 are aligned to direct the blended material (46 in Figures 1 and 2)

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generally in the direction of arrows 116 toward a discharge outlet 118. The discharge outlet 118 faces rearwardly relative to the travel direction 112 and the blended material 46 is discharged therefrom as the resurfacing machine 10 moves in the forward direction 12. --

Please replace the Abstract, beginning at page 15, line 1 and extending through page 15, line 8, with the following rewritten Abstract:

ABSTRACT

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--A blending apparatus which forms part of an asphalt pavement resurfacing machine has first and second stages. The first stage receives milled material through an inlet and blends the milled material with a rejuvenating fluid. The first stage has a transversely extending shaft from which paddles extend radially to blend the milled material with the rejuvenating fluid and direct it toward a first stage outlet. The second stage receives the blended material from the first stage outlet. The second stage has a respective shaft with mixing paddles extending radially therefrom to further blend the material and direct it toward a second stage outlet.--

IN THE CLAIMS:

Please amend claim 1 as follows:

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--1. (Amended) An asphalt pavement resurfacing machine having a transport structure, a heater mounted to said transport structure for heating an underlying surface to form a heated surface, a scarifier mounted to said transport structure to follow said heater and break up said heated surface to form a scarified surface, a mill mounted to said transport structure to follow said scarifier, grind said scarified surface to form a milled material and to prepare said underlying surface to a preset depth, a rejuvenating fluid sprayer for introducing a rejuvenating fluid to said milled material and a mixer for blending said milled material with said rejuvenating fluid, said mixer having a first stage comprising:

a first stage shell having a downwardly facing bottom opening;

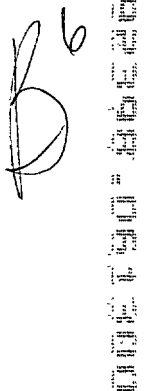
said first stage shell further having an inlet opening facing in a travel direction of said transport structure for admitting said milled material into said first stage;

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a first stage shaft extending transversely relative to said travel direction and mounted to said first stage shell for rotation about a first stage shaft axis within said first stage shell;

a plurality of paddles extending radially from said first stage shaft for blending said rejuvenating fluid with said milled material within said first stage shell and for directing said blended material thus formed toward a first stage discharge outlet facing rearwardly relative to said travel direction; and,

a rotator for rotating said shaft along with said paddles wherein, said first stage shell is placeable in close proximity to said underlying surface with said bottom opening adjacent thereto, said first stage being operatively combinable with the underlying surface to form a substantially enclosed chamber with said first stage shaft and said paddles being rotatable within the substantially enclosed chamber to blend the milled material with the rejuvenating fluid.--

 Please amend claim 2 as follows:

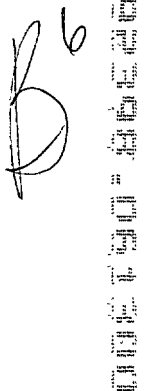
--2. An asphalt pavement resurfacing machine according to claim 1 wherein said mixer further has a second stage mounted to follow said first stage and receive said blended material from said discharge outlet of said first stage, said second stage comprising:

a downwardly opening second stage shell extending from a rear of said first stage shell;

a second stage shaft mounted in said second stage shell for rotation about a second stage shaft axis generally parallel to said first stage shaft axis;

a plurality of paddles extending substantially radially from said second stage shaft and rotatable therewith for further blending said blended material and directing said blended material toward a second stage discharge opening through said second stage shell facing rearwardly relative to said travel direction; and,

a rotator for rotating said second stage shaft about said second stage shaft axis.--

 Please amend claim 3 as follows:

--3. An asphalt pavement resurfacing machine as claimed in claim 1 wherein: said rotator includes a motor rotationally coupled to said first stage shaft.--



Pl [Please amend claim 4 as follows:]

--4. An asphalt pavement resurfacing machine as claimed in claim 3 wherein:
said motor is rotationally coupled to said first stage shaft by a motor sprocket
mounted to said motor to drive a corresponding first stage shaft sprocket mounted to said
first stage shaft by a chain extending thereabout.--

Pl [Please amend claim 5 as follows:]

--5. An asphalt pavement resurfacing machine as claimed in claim 2 wherein:
said rotator for said first and second stages includes a motor rotationally coupled to
said first and second stage shafts.--

Pl [Please amend claim 6 as follows:]

--6. An asphalt pavement resurfacing machine as claimed in claim 5 wherein:
said motor is rotationally coupled to said first and second stage shafts by a motor
sprocket mounted to said motor and coupled by chain to corresponding first and second stage
shaft sprockets mounted respectively to said first and second stage shafts.--

Pl [Please amend claim 7 as follows:]

--7. (Amended) A method for blending milled material with rejuvenating fluid in
an asphalt pavement resurfacing machine having a first pug mill attached thereto in an
inverted arrangement in which said pug mill has a housing with an open bottom face, said
first pug mill having a first paddle shaft mounted within said housing and extending
generally transversely relative to a travel direction of said transport structure, said method
comprising the steps of:

- (i) placing said open bottom face of said housing of said pug mill adjacent an
underlying surface to define, in conjunction with said housing, a substantially
enclosed chamber containing said first paddle shaft therein;
- (ii) moving said transport structure along said underlying surface to move said
first pug mill in said travel direction;

(iii) receiving said milled material and rejuvenating fluid into said first pug mill through a forwardly facing first inlet;

(iv) blending said milled material with said rejuvenating fluid by rotating said first paddle shaft within the substantially enclosed chamber to cause paddles extending radially therefrom to co-mingle said milled material with said rejuvenating fluid within said substantially enclosed chamber, said paddles being aligned to direct a blended material thus formed toward a rearwardly facing first discharge opening; and,

(v) allowing said blended material to be discharged, through said first discharge opening as said first pug mill moves in said travel direction.--

[Please amend claim 8 as follows:]

--8. (Amended) A method according to claim 7 wherein a second pug mill is attached to said transport structure to follow said first pug mill, said second pug mill having a housing with an open bottom face, said second pug mill having a second inlet for receiving said blended material discharged from said first discharge opening, said second pug mill having a second paddle shaft mounted within said housing generally parallel to said first paddle shaft and having a plurality of paddles extending substantially radially therefrom, said method including the further steps of:

(vi) placing said open bottom face of said housing of said second pug mill adjacent said underlying surface;

(vii) receiving said blended material into said second pug mill through said second inlet;

(viii) rotating said second paddle shaft to further blend said blended material received from said first pug mill, said paddles being aligned to direct further blended material thus formed toward a rearwardly facing second discharge opening; and,

(ix) discharging said further blended material in a windrow from said second discharge opening.--

Please add the following new claim:

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- 12. A method as claimed in Claim 7 wherein:
said rejuvenating fluid is added to said milled material after milling and
ahead of said first pug mill.--

REMARKS

The application as filed included claims 1-10, claim 11 was added by a Preliminary Amendment filed April 10, 2001, and new claim 12 has been added by this document. Accordingly, claims 1-12 are pending in the application. It is respectfully submitted that support for the amendments to claims 1-8 provided herein, as well as the addition of claim 12 provided herein, is provided in the application as originally filed.

The present Office Action rejects claims 1,2,7 and 8 under 35 U.S.C. §102(b) as being anticipated by Cutler (U.S. Patent No. 4,124,325); and rejects claims 3 - 6 and 9 under 35 U.S.C. §103(a) as being unpatentable over Cutler (U.S. Patent No. 4,124,325). Claims 10 and 11 are listed as being rejected in the Office Action Summary but no specific rejections of these claims is cited in the "Detailed Action" portion of the Office Action. Accordingly, the Examiner is respectfully requested to clarify the status of pending claims 10 and 11.

The Specification has been amended at several locations to recite "asphalt pavement" and "asphalt pavement surface" in lieu of "asphalt" and "asphalt surface" as recited in the application as originally filed, for purposes of clarification, with these amendments being supported by the application as originally filed. The foregoing amendments occur at the following locations in the Specification as indicated in the attached "Version With Markings to Show Changes Made for Patent Application Serial No. 09/592,398": the Background of the Invention Section; the paragraph beginning at page 5, line 20 and extending through page 5, line 25; the paragraph beginning at page 5, line 26 and extending through page 6, line 5; and the Abstract.

The Specification has also been amended, within the paragraph beginning at page 7, line 23 and extending through page 8, line 2, to emphasize that the paddles 114 and first stage shaft 110 are rotatable *within the enclosed chamber* (words in italics added by

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Amendment) formed when the first stage 102 in use is placed in close proximity to the underlying surface, as recited in the Specification at page 7, lines 17-19. The foregoing Amendment to the Specification has been provided in this document to provide correspondence in this regard between the pending claims as amended and the Specification. It is respectfully submitted that none of the amendments to the Specification provided herein constitute new matter and, accordingly, Examiner's approval of the previously discussed amendments to the Specification is respectfully requested.

The preambles of pending claims 1-6 have been amended to emphasize that these claims are directed to "an asphalt pavement resurfacing machine" instead of "an asphalt resurfacing machine" as recited originally, consistent with the previously discussed amendments to the Specification. It is respectfully submitted that no new matter has been added by these amendments to claims 1-6, which were not done in response to the present Office Action. Accordingly, Examiner's approval of these amendments to claims 1-6 is respectfully requested.

The rejection of claims 1, 2, 7 and 8 under 35 U.S.C. §102(b) as being anticipated by Cutler, are respectfully traversed. It is respectfully submitted that Cutler does not disclose or suggest the structural features of pending claims 1 and 2 or the method steps of pending claims 7 and 8, for at least the following reasons. Independent claim 1, and claim 2 which depends therefrom, are directed to an asphalt pavement resurfacing machine which includes a mixer, also referred to in the Specification and the pending method claims as a pug mill, for blending milled material with rejuvenating fluid. Claim 1 indicates that the mixer has a first stage comprising a first stage shell (also referred to in the Specification as a housing) having a downwardly facing bottom opening, with the first stage shell further having an inlet opening facing in a travel direction of the transport structure of the surfacing machine for admitting the milled material into the first stage shell.

Cutler discloses various embodiments of road repaving machines, including the embodiment illustrated in Figs. 12 and 13, relied upon by the Examiner in the present Office Action. More particularly, the Examiner relies upon the pug-mill agitator device 360 and the associated backup plate 362 to teach the previously recited features of pending claim 1. In the first instance, it is respectfully submitted that the backup plate 362 of Cutler does not teach or suggest a shell, within the meaning of the word shell as disclosed in the captioned

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application and, accordingly, Cutler does not teach or suggest a first stage shell having a downwardly facing bottom opening. However, assuming *arguendo* that Cutler teaches or suggests a first stage shell, which is rejected here, it is respectfully submitted that Cutler does not teach or suggest a first stage shell having an inlet opening facing in a travel direction of the transport structure for admitting milled material into the first stage. In contrast, the backup plate 362 disclosed in Cutler and relied upon by Examiner, does not include any aperture or opening, much less one facing in a travel direction of the transport structure (which would be toward the left in Figs. 12 and 13) for admitting milled material into a first stage mixer. Furthermore, it is respectfully submitted that Cutler does not suggest such a feature. Instead, Cutler discloses a conveyor 355 which conveys hot mix from a hopper 350 to a delivery and dispersing position 356 upstream of the pug-mill agitator device 360 (Col. 9, lines 36-38). Such a conveyor is not required by the pavement resurfacing machine of the present invention as recited in claim 1 (refer to Specification, Page 6, lines 5-15; Figs. 1 and 2).

Claim 1 further indicates that the first stage of the mixer includes a first stage shaft extending transversely relative to the travel direction of the resurfacing machine and mounted to the first stage shell for rotation about a first stage shaft axis and a plurality of paddles and extending radially from the first stage shaft for blending the rejuvenating fluid with the milled material and for directing the blended material thus formed toward a first stage discharge outlet facing rearwardly relative to the travel direction. Claim 1 has been amended to emphasize that the first stage shaft rotates within the first stage shell and that the blending is within the first stage shell. As discussed previously, it is respectfully submitted that Cutler does not teach or suggest a shell at all and accordingly does not teach or suggest a first stage shaft rotatable therein or blending of rejuvenating fluid and milled material within a first stage shell. Additionally, as discussed previously the backup plate 362 of Cutler does not include any aperture or opening and accordingly, does not teach or suggest a first stage discharge outlet facing rearwardly relative to the travel direction of the transport structure as recited in pending Claim 1. Accordingly, it is respectfully submitted that pending claim 1 further distinguishes over Cutler.

Claim 1 also recites a rotator for rotating the shaft along with the paddles wherein the first stage shell is placeable in close proximity to the underlying surface. Claim 1 has been

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amended to emphasize that the bottom opening of the first stage shell is adjacent to the underlying surface when the first stage shell is placed in close proximity to the underlying surface and that the first stage is operatively combinable with the underlying surface to form a substantially enclosed chamber with the first stage shell and that the paddles are rotatable within the substantially enclosed chamber to blend the milled material with rejuvenating fluid. It is respectfully submitted that the pug-mill agitator device 360 and backup plate 362 of Cutler are not operatively combinable with the underlying surface shown in Cutler to form a substantially enclosed chamber. Quite in contrast, it may be seen from Fig. 13 that the entire forward side of agitator 360 is open.

A stated purpose of Applicant's invention is to provide superior mixing for blending of milled material with at least rejuvenating fluid and any other rejuvenating materials (refer to Specification, page 2, lines 12-14). As shown in Fig. 13, the pug-mill paddles 361 of the pug-mill agitator device 360, relied upon by Examiner, do not rotate within a substantially enclosed chamber in use, unlike the paddles of the first stage mixer recited in pending Claim 1. Accordingly, it is respectfully submitted that the device disclosed in Cutler is not capable of accomplishing the mixing which may be achieved by the claimed first stage mixer recited in pending Claim 1.

It is respectfully submitted that Claim 2 further defines the invention and further distinguishes over Cutler for at least the following reasons. Claim 2 indicates that the asphalt pavement resurfacing machine further includes a second stage mounted to follow the first stage and receive blended material from the discharge outlet of the first stage, with the second stage including a downwardly opening second stage shell extending from a rear of the first stage shell recited in pending Claim 1. Whether or not the spreader augers 370 and 371 of Cutler disclose a second stage mounted to follow a first stage, as stated by Examiner in the present Office Action, it is respectfully submitted that Cutler does not teach or suggest a downwardly opening second stage shell extending from a rear of a first stage shell. Since Examiner has relied upon the backup plate 362 of Cutler to disclose a first stage shell, and Fig. 13 of Cutler shows no structure extending rearwardly from backup plate 362, it is respectfully submitted that the following statement by Examiner, with regard to teaching the second stage shell of pending Claim 2, appears to be without merit:

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"The downwardly opening second stage shell is seen as the shell of the machine (310)".

The provision of first and second stage mixers in the mixer or pug-mill of the present invention, as reflected in the recitations of pending claims 1 and 2 respectively, is for achieving improved blending, which is explained in the following excerpt from the Specification:

"Preferably, for better blending, the blended material will not be immediately discharged from the first stage discharge outlet 118, but rather will be further blended in a second stage 130 which follows the first stage 102".
(Specification, page 8, lines 12-14).

In contrast, the stated purpose in Cutler of the spreader augers 370 and 371, relied upon by Examiner to disclose a second stage mixer, is to "further spread and level the new composition" (column 9, lines 51-52).

In view of the foregoing, it is respectfully submitted that Cutler does not disclose the structural features of pending independent claim 1 or claim 2 which remains dependent from claim 1. Accordingly, reconsideration and withdrawal of Examiner's rejection of claims 1 and 2 under 35 U.S.C. § 102(b) is respectfully requested. Furthermore, it is respectfully submitted that Cutler does not suggest the structural features of pending Claims 1 and 2 and accordingly, it is respectfully submitted that a rejection of claims 1 and 2 under 35 U.S.C. § 103(a) would be without merit.

It is respectfully submitted that Cutler does not teach or suggest the method steps of pending independent claim 7 and claim 8 which depends therefrom, for at least the following reasons. Independent claim 7, as amended, is directed to a method for blending milled material with rejuvenating fluid in an asphalt pavement resurfacing machine having a first pug-mill attached thereto in an inverted arrangement in which the pug-mill has a housing with an open bottom face and also has a first paddle shaft mounted within the housing and extending generally transversely relative to a travel direction of the transport structure. The method steps of amended claim 7 include the step of placing the open bottom face of the housing of the pug mill adjacent an underlying surface to define, in conjunction with the housing, a substantially enclosed chamber containing the first paddle shaft therein. It is

and 371 have an open face adjacent to the underlying surface as shown in Fig. 13 which appears to be inconsistent with the Examiner's reliance upon the shell of the machine 310 to teach a downwardly opening second stage shell, as noted by the Examiner in connection with the Examiner's discussion of the rejection of claim 2. Accordingly, it is respectfully submitted that claim 8 further distinguishes over Cutler.

Also, the recitations of pending claim 8 indicate that the claimed method includes the step of discharging the further blended material in a windrow from the second discharge opening, which was included in Claim 8 as originally filed. This method step of the present invention is advantageous since it provides a mechanism by which volume throughput can be readily ascertained by determining the rate of advance of the asphalt pavement resurfacing machine and measuring of the windrow height, which in turn enables much better control over the rejuvenating fluid addition. It is respectfully submitted that Cutler does not disclose or suggest the foregoing method step of pending claim 8, nor the associated advantages derived therefrom.

In view of the foregoing, it is respectfully submitted that Cutler does not disclose the method steps of pending claims 7 and 8 and accordingly, reconsideration and withdrawal of Examiner's rejections of claims 7 and 8 under 35 U.S.C. § 102(b), is respectfully requested. Furthermore, it is respectfully submitted that Cutler does not suggest the method steps of pending claims 7 and 8 and that accordingly, a rejection of these claims under 35 U.S.C. § 103(a) as being unpatentable over Cutler, would be without merit.

The rejection of claims 3-6 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Cutler is respectfully traversed. Claims 3-6 remain dependent from independent apparatus claim 1 and claim 9 remains dependent from method claim 8, which remains dependent from independent method claim 7. Accordingly, it is respectfully submitted that claims 3-6 patentably distinguish over Cutler for at least the reasons set forth previously herein with respect to the discussion of the rejection of claim 1 and claim 9 patentably distinguishes over Cutler for at least the reasons set forth previously herein with respect to the discussion of the rejections of claims 7 and 8. In view of the foregoing, reconsideration and withdrawal of Examiner's rejections of claims 3-6 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Cutler, is respectfully requested.

Pending claim 10 remains dependent from independent method claim 7 and intervening dependent method claim 8, and pending claim 11 remains directly dependent from independent method claim 7. Accordingly, it is respectfully submitted that claim 10 patentably distinguishes over the documents of record for at least the reasons set forth previously herein with respect to the discussion of the rejection of claims 7 and 8 over Cutler, and that claim 11 patentably distinguishes over the documents of record for at least the reasons set forth previously herein with respect to the discussion of the rejection of claim 7. Also, as set forth previously, the Examiner has not indicated the status of claims 10 and 11 in the present Office Action and clarification is respectfully requested.

Claim 12 has been added by this document and depends directly from independent method claim 7. Claim 12 further defines the claimed invention relative to claim 7 by emphasizing that the rejuvenating fluid is added to the milled material after milling and ahead of the first pug mill. Accordingly, it is respectfully submitted that new claim 12 patentably distinguishes over the documents of record for at least the reasons presented previously with respect to the discussion of the rejection of claim 7.

In view of the foregoing, early allowance and issuance of pending claims 1-12 is respectfully requested.

In the event the Examiner wishes to discuss any aspect of this response, please contact the undersigned at the telephone number listed below.

Respectfully submitted,
BUTLER, SNOW, O'MARA,
STEVENS & CANNADA, PLLC

December 13, 2001
Date

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VERSION WITH MARKINGS TO SHOW CHANGES
MADE FOR PATENT APPLICATION SERIAL NO. 09/592,398

IN THE SPECIFICATION:

The Background of the Invention Section, beginning at page 1, line 5 and extending through page 2, line 14 has been amended as follows:

BACKGROUND OF THE INVENTION

Asphalt pavement consists essentially of an aggregate and sand mixture held together with a petroleum based binder, such as tar. With continued exposure to sun, moisture, traffic, freezing and thawing, asphalt [surfaces degrade] pavement degrades. The degradation is principally in the binder, rather than the aggregate and sand mixture which makes up the bulk of the asphalt pavement. Also, much of the degradation occurs within the top two or three inches of the surface.

Traditionally, worn asphalt pavement was not restored but instead was torn up and replaced with new asphalt pavement. This is a costly approach and creates a problem as to what to do with the torn up pavement. Accordingly, techniques and apparatus have been developed for restoring or rejuvenating the top few inches of an asphalt [paved] pavement surface.

A typical road resurfacing machine has a heater for heating and softening the asphalt pavement surface as it passes along the [asphalt] surface. Following the heater is a "rake" or "scarifier" which breaks up or "scarifies" the softened pavement. The scarified pavement is generally crushed or "milled", blended with rejuvenating fluid and optionally additional sand or aggregate and redeposited. The redeposited material is spread out and rolled to create a rejuvenated surface comparable in quality to the original surface before degradation.

In order to produce a rejuvenated surface of high quality, it is important to ensure that an appropriate amount of rejuvenating fluid is added. Generally, a core sample or several core samples are initially taken of the surface to be rejuvenated and a desired ratio of rejuvenating material to milled material is analytically determined.

It is also important to thoroughly intermingle the milled material with the rejuvenating material, which will at least include a fluid but may also include additional

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sand and/or aggregate.

It is an object of the present invention to provide a method and apparatus for thoroughly blending the milled material with at least the rejuvenating fluid and with any other rejuvenating materials.

The paragraph beginning at page 5, line 20 and extending through page 5, line 25, has been amended as follows:

Behind the power plant 14 and also mounted on the transport structure 11 is a heater 16 which includes numerous burners and associated plumbing for heating an asphalt pavement surface 18 upon which the resurfacing machine 10 travels. A propane (or other combustible fuel) tank 20 and a combustion blower 22 serve the burners in the heater 16. The heater 16 directs heat at the asphalt pavement surface 18 to cause softening of an upper part of the asphalt pavement surface 18.

The paragraph beginning at page 5, line 26, and extending through page 6, line 5, has been amended as follows:

The softened asphalt pavement surface 18 is initially dislodged by a raking device, generally indicated by reference 30, mounted to the transport structure 11, and which follows the heater 16. The raking device 30 has rakes which dislodge the heated asphalt pavement surface 18. The raking device 30 may include main rakes 32 and extension rakes 34, the extension rakes 34 performing a similar function to the main rakes 32, but to the outside edges. The main rakes 32 break up material around manholes where a main mill 36 behind the raking device 30 cannot run.

The paragraph beginning at page 7, line 23 and extending through page 8, line 2, has been amended as follows:

A first stage shaft 110 is mounted to the first stage shell 104 for rotation about a first stage shaft axis 112 which extends transversely relative to the travel direction 12. A plurality of paddles 114 extend from the first stage shaft 110 in a direction generally radial relative to the first stage shaft axis 112. The paddles 114 are rotatable with the first stage shaft 110 within the enclosed chamber to blend the milled material with the

rejuvenating fluid. The paddles 114 are aligned to direct the blended material (46 in Figures 1 and 2) generally in the direction of arrows 116 toward a discharge outlet 118. The discharge outlet 118 faces rearwardly relative to the travel direction 112 and the blended material 46 is discharged therefrom as the resurfacing machine 10 moves in the forward direction 12.

The Abstract, beginning at page 15, line 1 and extending through page 15, line 8, has been amended as follows:

ABSTRACT

A blending apparatus which forms part of an asphalt pavement resurfacing machine has first and second stages. The first stage receives milled material through an inlet and blends the milled material with a rejuvenating fluid. The first stage has a transversely extending shaft from which paddles extend radially to blend the milled material with the rejuvenating fluid and direct it toward a first stage outlet. The second stage receives the blended material from the first stage outlet. The second stage has a respective shaft with mixing paddles extending radially therefrom to further blend the material and direct it toward a second stage outlet.

IN THE CLAIMS:

Claim 1 has been amended as follows:

1. (Amended) An asphalt pavement resurfacing machine having a transport structure, a heater mounted to said transport structure for heating an underlying surface to form a heated surface, a scarifier mounted to said transport structure to follow said heater and break up said heated surface to form a scarified surface, a mill mounted to said transport structure to follow said scarifier, grind said scarified surface to form a milled material and to prepare said underlying surface to a preset depth, a rejuvenating fluid sprayer for introducing a rejuvenating fluid to said milled material and a mixer for blending said milled material with said rejuvenating fluid, said mixer having a first stage comprising:

a first stage shell [which is substantially enclosed but for] having a downwardly facing bottom opening;

[an inlet opening through] said first stage shell further having [a forward face] an inlet opening [of said shell] facing in a travel direction of said transport structure for [receiving] admitting said milled material into said first stage shell;

a first stage shaft extending transversely relative to said travel direction and mounted to said first stage shell for rotation about a first stage shaft axis within said first stage shell;

a plurality of paddles extending radially from said first stage shaft for blending said rejuvenating fluid with said milled material within said first stage shell and for directing said blended material thus formed toward a first stage discharge outlet facing rearwardly relative to said travel direction; and,

a rotator for rotating said shaft along with said paddles wherein, said first stage shell is placeable in close proximity to said underlying surface [to use said underlying surface as a bottom part thereof] with said bottom opening adjacent thereto, said first stage being operatively combinable with the underlying surface to form a substantially enclosed chamber with said first stage shaft and said paddles being rotatable within the substantially enclosed chamber to blend the milled material with the rejuvenating fluid.

Claim 2 has been amended as follows:

2. An asphalt pavement resurfacing machine according to claim 1 wherein said mixer further has a second stage mounted to follow said first stage and receive said blended material from said discharge outlet of said first stage, said second stage comprising:

a downwardly opening second stage shell extending from a rear of said first stage shell;

a second stage shaft mounted in said second stage shell for rotation about a second stage shaft axis generally parallel to said first stage shaft axis;

a plurality of paddles extending substantially radially from said second stage shaft and rotatable therewith for further blending said blended material and directing said blended material toward a second stage discharge opening through said second stage shell facing rearwardly relative to said travel direction; and,

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a rotator for rotating said second stage shaft about said second stage shaft axis.

Claim 3 has been amended as follows:

3. An asphalt pavement resurfacing machine as claimed in claim 1 wherein: said rotator includes a motor rotationally coupled to said first stage shaft.

Claim 4 has been amended as follows:

4. An asphalt pavement resurfacing machine as claimed in claim 3 wherein: said motor is rotationally coupled to said first stage shaft by a motor sprocket mounted to said motor to drive a corresponding first stage shaft sprocket mounted to said first stage shaft by a chain extending thereabout.

Claim 5 has been amended as follows:

5. An asphalt pavement resurfacing machine as claimed in claim 2 wherein: said rotator for said first and second stages includes a motor rotationally coupled to said first and second stage shafts.

Claim 6 has been amended as follows:

6. An asphalt pavement resurfacing machine as claimed in claim 5 wherein: said motor is rotationally coupled to said first and second stage shafts by a motor sprocket mounted to said motor and coupled by chain to corresponding first and second stage shaft sprockets mounted respectively to said first and second stage shafts.

Claim 7 has been amended as follows:

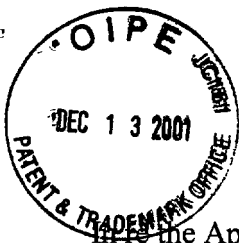
7. (Amended) A method for blending milled material with rejuvenating fluid in an asphalt pavement resurfacing machine having a first pug mill attached [to a transport structure associated with said asphalt resurfacing machine] thereto in an inverted arrangement in which said pug mill has a



- (vi) placing said open bottom face of said housing of said second pug mill adjacent said underlying surface;
- [(v)] (vii) receiving said blended material into said second pug mill through said second inlet;
- [(vi)] (viii) rotating said second paddle shaft to further blend said blended material received from said first pug mill, said paddles being aligned to direct further blended material thus formed toward a rearwardly facing second discharge opening; and,
- [(vii)] (ix) discharging said further blended material in a windrow from said second discharge opening.

New Claim 12 has been added as follows:

- 12. A method as claimed in Claim 7 wherein:
said rejuvenating fluid is added to said milled material after milling and ahead of said first pug mill.--



12-20-01

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

FRANCESCO A. CRUPI

Serial No.: 09/592,398

Filed: June 13, 2000

For: MIXING APPARATUS AND
METHOD FOR BLENDING MILLED
ASPHALT WITH REJUVENATING
FLUID

Group Art Unit: 3673

Examiner: A. Pechhold

Attorney Docket No.: 023266.42684
(previously 50063.0000-1)

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DEC 28 2001

GROUP 3600

TRANSMITTAL LETTER

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

The following documents for the above-captioned application are enclosed herewith:

1. Petition for Extension of Time and Amendment;
2. Check No. 126411 in the amount of \$200.00;
3. U.S. Express Mail Label No.: EK716354155US;
4. Return Postcard

Respectfully Submitted,

Butler, Snow, O'Mara, Stevens &
Cannada, PLLC

December 13, 2001
Date

By: Bradley D. Beck
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